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The following subjects have already been discussed in eadier iusses:

Vol. 1. No. 1. The desert locust situation; San José scale in Western Europe; potato blight in Chile; diseases of economic plants in Iraq; progress in plant protection in India.

Vol. 1. No. 2. The plant disease situation in the United States; the locust problem in Central America and Mexico; pineapple diseases and pests in Mexico; observations on insect pests in Israel; insect problems in Nicaragua.

Vol. 1. No. 3. The migratory locust in South America; the plant disease situation in the United States; two important tree borers in Israel; infestation control in rice; spiny bollworm of cotton in Iraq.

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FAO Plant Protection Bulletin

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World Reporting Service on Plant Diseases and Pests

Disease Outbreaks on Economic Plants in Italy

Antonio Ciccarone

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Based on the writer's own observations, mainly in Southern Italy, this report is a summary of the more important and noteworthy outbreaks of plant diseases in the last two years.

The occurrence of certain species of *Pythium*, causing damping-off of vegetables in Italy is recorded here for the first time. A few cases of mite infestation are also included, because such disorders were previously attributed to plant parasites. Several other diseases threatening the production of important crops have been under intensive study, the results of which have been published in detail elsewhere.

Olive Anthracnose

Olive anthracnose or leprosy, caused by *Gloeosporium olivarum* Almeida, was not known to exist in Italy until its first serious epidemic was reported in February 1952 in Puglia, south of Lecce, on the Adriatic coast. This disease was probably introduced after 1940, when an extensive inspection of the olive plantations did not reveal its presence. At present, the disease appears to be restricted to an area of about 5,000 ha. in the province of Lecce and 400 ha. in the province of Brindisi. Its limited geographical distribution is possibly determined by two major factors, high air humidity and high soil moisture during the fall and winter in the region. High air humidity, in particular, favours the development of the fungus and reduces the vigor of the host.

As proved experimentally, the fungus can infect leaves and twigs as well as fruits. The infection not only reduces the yield of the tree but also affects the quality of the oil produced. The oil extracted from the fruits of infected trees is reddish in color and difficult to centrifuge, remaining turbid with an unpleasant soil flavor, while its acidity increases by 10–13 per cent.

Vine Diseases

Infectious degeneration. This disease has been very prevalent in recent years on grape vines in Sardinia, where it was overlooked for many years. It is known in Europe under various names, such as court-noué, roncet, and Reisigkrankheit. Its cause has not been definitely determined, but was recently claimed to be a virus complex.

Dead arm. Outbreaks of the dead arm disease, caused by *Phomopsis viticola* (Redd) Goid., during

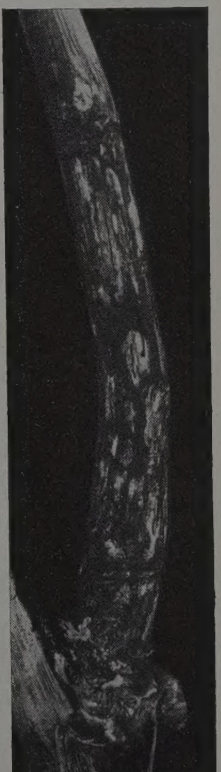

Fig. 1. *Stem of grape vine showing infection of dead arm.*

1951 and 1952, have resulted in tremendous losses of vines near La Spezia in Liguria on the northwest coast of Italy (Figure 1).

Vine decline. Decline of vine growth in Abruzzi on the Adriatic coast bas caused considerable damage. This disorder. previously attributed to plant parasites, was proved recently to be caused by various species of mites, especially the gall mites of Eriophyidae.

Fig. 2. *Fig fruit infected with mosaic.*

Fig Mosaic

Until 1946 when it was found near Naples, this disease was not known to occur in Italy. Since then it has spread rapidly and is now present in nearly all the fig groves of the country, including Sicily and Sardinia. The island of Capri is probably the only area still free from this disease (Figure 2).

Powdery Mildew of Cynara

Following its sudden outbreak in November 1948, the powdery mildew, *Ovulariopsis cynarae* (Ferr. et Massa) Ciccar., has become increasingly destructive on globe artichoke (*Cynara scolymus*) and cardoon (*C. cardunculus*). This disease is widely distributed throughout the country, including Sicily and Sardinia.

During 1951 and 1952, the acreage sown to globe artichoke has greatly diminished in the province of Imperia on the coast of the Ligurian Sea, where the infection has been most severe. In this area the disease is prevalent from October to December, when the temperature declines rapidly. Damage is particularly heavy where the climate is marginal for the epidemic, such as on the hills surrounding Ospedaletti, and where the globe artichoke is forced for the November market. The host is most susceptible during the heading stage. On cardoon, substantial losses due to this disease were reported in the province of Forli, Emilia.

After four years' trial, the application of wettable sulphur dust till the middle of October, followed by salicylanilide (Shirlan A. G.) is recommended for the control of the disease.

Tomato Diseases

Early blight. Of the many diseases which attack tomatoes, early blight, caused by *Alternaria porri solani* (E. et M.) Neerg., is an important one. In 1952, it seriously damaged tomato plants in the Gulf of Naples when the third crop began to ripen around 20th July onwards, reducing produce in the Sarno Valley by as much as 40 per cent. Since this disease was not reported as economically important in other parts in Italy, the heavy outbreaks in this region may be attributed to the intensive farming system, the lack of proper rotation, and the accumulation of inoculum in the soil where tomatoes have been grown for centuries. Weekly applications of 1 per cent Bordeaux mixture, 1 per cent Shirlan A. G. or 1.5 per cent Phygon, from the end of July onwards, gave promising but incomplete control. The American variety, Southland, showed considerable resistance to this disease.

Big bud. This disease of virus origin was recently found for the first time in Italy and was observed in many locations on the Tyrrhenian coast, especially near Rome and Genoa.

Double streak. Also a virus disease, it was observed near Naples, where tomato is grown in succession with early potatoes.

Bruciore. A wilt, known as bruciore or appicciatura, spreads widely in southern and central Italy and is especially prevalent in the province of Salerno and in Sardinia. This disorder is believed to be caused by various factors, including climatic conditions, adverse cultural practices, and animal and fungus parasites. Among the animal parasites, the tomato russet mite, *Vasates destructor* Keifer, was found to be an important cause. Spraying with parathion followed by sulphur dusting proved to be effective in controlling this mite.

Verticillium Wilt of Peppers

Pepper (*Capsicum*) wilt, caused by *Verticillium albo–atrum* Reinke et Berth., is now widespread throughout Italy. In testing

various chemicals for its control, promising results were obtained with chloropicrin as a soil fumigant. In areas where the peppers are highly priced and in great demand by the canning industry, this soil treatment may be practised.

Damping-off of Vegetables

Pepper and cucumber in seedbeds near Rome were destroyed to a great extent, especially in 1950, by *Pythium ultimum* Trow and *P. splendens* Braun. Lettuce seedlings were seriously damaged near Genoa by a mixed infection of *P. debaryanum* Hesse and *P. oligandrum* Drechsler. All these species of *Pythium*, except *P. debaryanum*, had not been reported before in Italy.

Forage Diseases

Leaf spot of Berseem. Berseem (*Trifolium alexandrinum*) sustained heavy losses from a destructive leaf spot disease in February and March of 1951 and 1952, especially in the experimental plots near Rome. The causal fungus was provisionally named *Stagonospora recedens* (Massal.) Jones et Weimer f. *trifolii–alexandrini* Ciccar. This disease can be effectively controlled by mowing the diseased patches of the crop. The new growth obtained later in the spring, when the climate is drier and warmer, is usually dense and healthy.

Downy mildew of Fenugreek. Fenugreek (*Trigonella foenum–graecum*), an annual winter forage crop widely grown in Abruzzi on the Adriatic coast, was severely attacked in April 1951 by *Peronospora trigonella* Gaum., which had never been observed before in Italy. The disease appears at the time when anthesis begins, usually during the early part of April. Because of the increasing severity of this disease, many farmers in the affected regions have discontinued the growing of this locally important crop.

Major Pests of Crops in Afghanistan: a Preliminary Note

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THE writer arrived in Afghanistan in June 1952 on an assignment under the FAO Expanded Technical Assistance Program as Plant Protection Advisor to the Government of Afghanistan. The following notes on the major insects and certain diseases attacking cultivated crops were collected during a period of four months.

Identification of the insects was not always possible because often only immature stages could be found, or only the after effects of injuries observed. As far as possible immature stages are being bred up to adult. Other insects await determination by experts. In a number of localities the crop had already been harvested before the writer's visits, and it has only been possible to obtain approximate figures of losses.

Ecological Conditions

Before giving details of some of the more important insects, it seems desirable to outline briefly the physical conditions of the country and of the different geographical zones encountered.

The eastern and central part of the country is traversed by mountain ranges radiating out in the form of a fan mainly in a westerly direction from the Hindu Kush range, a continuation of the Himalayas. The only flat parts of the country are the plains of Afghan–Turkestan to the north, which are bounded by the Oxus river forming the boundary between Afghanistan and Russian Turkestan; the desert region in the south–west and west, extending to the Iranian frontier and intersected by the lower courses of the rivers flowing westwards from the central mountain range; the Kabul plateau; and the Jalalabad valley to the south–east of Kabul towards the Khyber Pass.

Climatic conditions vary according to altitude. Thus in the northern plains of Afghan–Turkestan, at an altitude of approximately 2,000 ft., the winters are fairly cold with summer temperatures as high as 112° F. Alpine conditions prevail in the high mountains, which rise to a height of 20,000 ft. and over. At Kabul (6,000 ft.) and in the higher cultivated valleys, the winter is severe, with deep snow lying for three months of the year: the summer months are warm with maximum temperatures of over 90° F. In the Jalalabad and neighbouring valleys, at an altitude of 2,000 ft., the climate is similar to that of the Pakistan North Western Province. In Kandahar and Farah Provinces to the southwest (1,000 to 3,000 ft.), summer temperatures are intense and winters mild. Rainfall is scarce throughout the summer months, the country receiving most of its precipitation from winter snow and small rains in spring. The atmosphere is generally dry with brilliant sunshine during most of the year. In Herat and Farah Provinces to the west, a strong easterly wind blows during the summer months.

Cultivation is restricted to the valleys, the steppe country to the north, the Kabul plateau and the arid region to the west where it is watered by rivers supplemented by irrigation canals. All cultivated land is under irrigation except for some isolated areas where dry farming is practised. In some localities, particularly in the plains to the north and west, irrigation water is insufficient during the summer months thus impairing the growth of perennial crops and increasing their liability to insect attack.

Wheat, the staple food crop, is grown throughout the country. Next in importance are barley, rice and maize. The main cash crops are deciduous fruits, such as grape–vines, apple, apricot, plum, pear, almond, pomegranate, mulberry and quince, which are grown in all localities where irrigation is sufficient; and muskmelon and water-

melon in the low regions to the north and west and in the Jalalabad valley. Cotton is extensively grown in the steppe region to the north where there is also a small area under sugar beet.

Insects of Deciduous Fruits

Ermine moth. Infestation by the ermine moth, *Hyponomeuta padellus* L., is the most important limiting factor in the cultivation of deciduous fruits. A severe attack sometimes results in the complete loss of the crop. Almond and apple are the fruits most severely attacked, followed by plum, apricot and cherry in order of severity. The larvae also feed on willow, commonly planted along canals and irrigation ditches.

Newly hatched larvae begin feeding on buds and young leaves and later cover the foliage with dense masses of webbing in which they pupate. There is only one generation per year, the adult moths emerging in June to July according to altitude. Eggs are laid in clusters of from 10 to 30 or more on herbaceous shoots and are covered with a protective shield constructed by the ovipositing female. They hatch in two to three weeks, the newly emerged larvae remaining in diapause without feeding until the following spring. The larvae are attacked by numerous species of parasitic Hymenoptera which emerge from the final larval instar and pupal stage of their hosts.

This species in common in central and temperate Europe, the Mediterranean region and North Africa, where control measures include pruning infested trees in autumn and winter, and lopping willow trees bordering fruit orchards in order to destroy the eggs.

In addition to pruning, trials are planned using dormant winter washes during the autumn to destroy over-wintering larvae. These measures may have to be followed by spray applications in early spring, not later than bud burst stage, to destroy larvae before the webbing becomes too dense.

Codling moth. Attack by the codling moth, *Carpocapsa* (*Cydia*) *pomonella* (L.), is common throughout Afghanistan wherever apples are grown. Attack is most severe in the northern steppe region, mainly, in the writer's opinion, because of lack of established markets and consequent over-production and accumulation of infested fallen fruits. It has not been possible to obtain figures of losses in different localities, degree of attack varying greatly even in the same locality. Rough estimates of infested fruits on the trees gave figures varying from 5 to 90 percent.

Almond moth. Severe infestation of an unidentified almond moth, possibly *Malacosoma* sp., is limited to the hotter areas, being particularly prevalent in parts of Kandahar Province to the southwest where there is a large export of almonds. Attacks take place in spring and early summer when trees in some orchards may be completely defoliated. There is considerable loss of crop but it has been impossible to obtain any figures. The attack had ceased at the time of the writer's visit and the trees had produced a new flush of foliage.

Insects of Cucurbits

Melon beetle. The larvae and adults of a Coccinellid, tentatively identified as *Epilachna dodecastigma* Muls., skeletonise the leaves and eat the pericarp of the developing fruits of the Persian and imported varieties of muskmelon, frequently causing severe losses. This insect is found wherever melons are cultivated, on the western and northern plains and in the Jalalabad valley, where high temperatures prevail. Watermelon, however, is not attacked.

Melon fruit fly. Infestation of a fruit fly, probably *Myiopardalis* sp., is prevalent on melons. In Kandahar Province the infestation is particularly severe in the newly developed areas opened up as a result of the Helmand river irrigation project, amounting closely to 100 percent in imported varieties and up to 90 percent in nearby indigenous varieties. Watermelon is also subject to attack in this Province but to a lesser extent. In other parts of the country, infestation is slight.

Insects of Miscellaneous Crops

Sugar beet. This crop, which is cultivated on an intensive scale at Baghlan in Kataghan Province is attacked by the larvae of an unidentified Noctuid moth. Considerable defoliation may occur in early summer

but damage by succeeding generations is slight.

Cotton. The cotton plant is remarkably free from insect pests. *Aphis gossypii* Glover is present in small numbers but there may be sporadic and localised heavy infestations. It is believed that small, localised outbreaks of the bollworm, *Heliothis obsoleta* F. may also occur.

Poplar. Large plantations of *Populus alba*, and *P. euphratica* in the drier zones have been established throughout the country. Some damage is caused by an unidentified Cerambycid borer in localities where there is an irregular supply of irrigation water during the summer months. The larvae of a Chrysomelid beetle, possibly *Scelodonta* sp., have been responsible for severe damage on one poplar plantation near Kabul.

General Pests

Wasps. In Farah Province and to a lesser extent in Kandahar, an unidentified species of hornet (Vespidae) feeds on unscreened mature grapes and raisins in drying houses. Farmers estimate loss of grapes in vineyards at 50 percent. Ripe pomegranates are also attacked. Nests are constructed in mud brick walls of buildings and the walls which surround every orchard. Mud walls over which vines are trained are also constructed in vineyards.

The local method of destroying nests is by smoke, a circular concave mud plate with a central hole being placed over the entrance. The plate is packed with dry straw, stuck over the hole with mud and ignited, the smoke being blown into the hole by mouth. Nests are smoked in the early morning before the wasps become active. Adults in the nest are killed but most of the larvae survive. A campaign consisting of locating all nests in vineyards and compounds, and the introduction of some simple method of control, such as the placing of a small quantity of BHC dust in the entrance holes, should greatly reduce this destructive pest as well as a public nuisance.

Locusts. Three species of locust occur in Afghanistan, Moroccan locust (*Dociostaurus maroccanus* Thnb.) and the Italian locust (*Calliptamus italicus* L.), both of which are indigenous, and the Desert locust (*Schistocerca gregaria* F.) which invades the western and southwestern desert area periodically from Iran and Pakistan. The Moroccan and Italian locusts are at present the most important as far as the agricultural production of the country is concerned, but the Desert locust may become of more importance with the development of irrigation projects in Kandahar.

The Moroccan and Italian locusts oviposit in June and July in country sparsely covered with vegetation, mainly in the foothills bordering the steppe country in the north. Breeding grounds extend up the northern mountain valleys to a height of 3,000 ft. and in the low-lying steppe region up to the Russian frontier. Eggs hatch in spring, and hoppers and newly fledged adults invade cultivated areas. There is only one generation per year. Wheat as well as other cultivated crops may suffer severe damage.

Mature swarms of the Desert locust and fledglings from breeding in Iran invaded the southwestern and western desert regions of Kandahar and Farah Provinces and the extreme west of Herat in May and June 1952. From the records obtainable, only a few swarms entered Afghanistan, but in the same months of 1951 the invasion was on a larger scale though little damage to crops was reported. At the time of writing in October, one swarm derived from breeding in Pakistan and India has invaded the Jalalabad valley. Isolated individuals have been seen as far west as Kabul.

Plant Diseases

In addition to insect pests, considerable losses of crops are caused by fungus diseases and other plant parasites. Rusts (*Puccinia* spp.) and loose smut (*Ustilago tritici* Rostr.) are common on wheat throughout the country. Maize smut (*Ustilago maydis* Cda.) is also common in heavily irrigated areas.

A species of dodder (*Cuscuta*) is prevalent in alfalfa fields near Kabul, and in sugar beet fields in the north, infection being carried from field to field through irrigation canals. Another species of *Cuscuta* has caused severe losses in some plantations of *Populus euphratica* in the northern steppe

region where infection has been allowed to carry on without any attempt at control.

Many minor insect pests and diseases, and to some extent the major ones, too, result from inattention to proper cultural practices. This is particularly true of deciduous fruit trees in localities where there is over production. Little pruning is done, and dead and diseased wood is rarely cut out. The introduction of proper cultural methods will undoubtedly prevent such losses to a considerable extent.

Fall Webworm in Austria and Yugoslavia in 1952

V. E. WILKINS

European Plant Protection Organisation, Paris

SERIOUS damage done by the fall webworm (*Hyphantria cunea* Dr.) in 1951 led both the Austrian and Yugoslavian Governments to set aside considerable funds and organize extensive campaigns of control in 1952. In this they were encouraged by tangible offers of help made by the European Plant Protection Organisation and certain of its member Governments. FAO also provided financial aid to initiate work on the biological control of the pest and to develop research.

Control Campaign

The moths appeared in 1952 earlier than usual, at the beginning of the last week of April, and larvae were seen towards the middle of May, although cold weather at this period slowed down their development. The early infestation was considerably more serious than in 1951.

Mechanical control, such as cutting out the " nests " of larvae, was organized on a huge scale; in the Voyvodina province of Yugoslavia, about 4,500 people were recruited for this work. Chemical treatment was resorted to when hand collection was impossible; about 100,000 trees were treated in each of the two countries. In Yugoslavia, aerial treatment was carried out over more than 1,870 ha. of forests, 877 ha. of orchards, 117 ha. of parks, 1,012 km. of roadside trees, and 1,607 ha. of trees in built-up areas.

Energetic control measures applied by both Governments against the first generation of caterpillars were successful in reducing to comparatively negligible proportions the second generation, which appeared towards the end of July, and the caterpillars of this generation were also destroyed in many cases by the unusually hot weather which prevailed in both countries. In consequence, actual damage done to trees and crops was extremely small. Throughout the Voyvodina, for example, where hundreds of hectares of trees were completely defoliated in the autumn of 1951, it was difficult to find a single case of defoliation in the same period of 1952.

Thus the outlook for 1953 is hopeful. The spread of the pest has been halted; all concerned are on the alert, and although predictions are dangerous, it may well prove that vigorous and co-ordinated action has succeeded in keeping under control one of the most dangerous pests that has invaded Europe in recent years.

Conference in Vienna

A conference between representatives of the various Governments concerned, including those which provided practical help towards the control campaign in the two infested countries, was held by the European Plant Protection Organisation in Vienna on 7–8 November 1952. A report of the proceedings will shortly be published which will give particulars of the incidence of the pest, of the control measures taken and of the results; it also describes briefly the work on biological control, and the research which is now in progress, with financial assistance from FAO.

Plant Diseases and Insects in the United States

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Septoria Kernel Blight of Oats

DURING 1952, the kernel blight phase of Septoria black stem (*Leptosphaeria avenaria* Weber) was widespread on oats throughout most of the North Central States. It was found that the organism could be isolated from blighted kernels that had been in storage for over a month, which suggested the possibility of seed transmission.

No seedling infection resulted when infected seed was planted in sterilized sand, and all plants were grown to maturity without showing any of the symptoms of the disease. Emergence from the most heavily infected class, with groats heavily blackened and shriveled, was significantly lower than from less severely affected seed, probably because of damage to the kernels before harvest. In further trials with controlled temperatures as low as 50° F. (= 10° C.), to determine whether attack might occur at the lower temperatures that usually prevail during the germination of oats, no infection took place.

The possibility that Septoria-blighted oats might be toxic to livestock was also considered. In feeding tests with mice and chickens no evidence of toxicity to either was found. The results of these limited tests cannot of course be taken as applying to all animals.

First Record of Brassica Nematode

The Brassica-root nematode, *Heterodera cruciferae* Franklin, has hitherto been known to occur only in England and Wales. This year it was found in many of the fields near Half Moon Bay in San Mateo County, California, where cruciferous crops, especially brussels sprouts, have been grown commercially for at least 30 or 40 years. A high percentage of the fields examined were infested with heavy populations, and evidence indicates that the nematode has been present for many years.

Discovery of this nematode raises some problems for diagnosis and control. *H. cruciferae* is closely related to the sugar-beet nematode, *H. schachtii* A. Schm., from which it is distinguished by some slight morphological differences, and by the much narrower host range, which includes only crucifers whereas *H. schachtii* attacks a wide range of plants in many families including crucifers. It is doubtful if positive identifications can be made in the field. Previously the only species of cyst-forming nematode known to occur in cultivated fields in California has been *H. schachtii*. The presence of *H. cruciferae* complicates diagnosis, but correct identification will be essential for effective use of rotation programs in the control of either nematode.

Cladosporium Rot of Peppers

A decay of bell type peppers (*Capsicum*) from California has caused serious damage to some shipments received on the Chicago market during fall and early winter. The decay is caused by *Cladosporium herbarium* Fr. Moderately cool, wet seasons when rain or fog keeps the plants and fruits moist apparently favor infection and the development of decay.

Shipments arriving promptly usually show only slight evidence of infection, but delayed shipments or lots of peppers held on track or in stores develop conspicuous spots within a few days. Infected peppers held for a week or more in store coolers at 36° to 40°F. develop serious rot.

On arrival or shortly after, infected areas appear as light tan spots 1.5 to 3 mm. in diameter. As they enlarge the spots become slightly sunken with dark center and light brown border; later, the central area becomes black and shiny and the brown border sharply

delimited. Decayed tissue under spots 5 mm. or more in diameter is light grayish–brown and rather spongy. In a very humid atmosphere a fine green mold consisting almost entirely of spores develops over the larger lesions.

Most lesions appear where no visible wounds or other organisms are present, although the rot has been found following injuries and other decays. Experiments show that the fungus can infect apparently uninjured fruits but development of lesions is slower than on wounded peppers.

Rate of development of lesions resulting from natural infection is typified by the following observations. In one commercial lot, 310 spots that averaged 2.3 mm. in diameter enlarged to 3.8 mm. after four days in storage at 40°F. In another lot, 26 spots averaged 1.2 mm. on arrival and 2.7 mm. after three days' storage at 70°, and during storage several new spots about 1 mm. in diameter developed.

Since *C. herbarum* is a weak parasite of peppers and apparently can produce infection only under special conditions of temperature and moisture, it is not very likely that it will be a common cause of serious decay. Under favorable field conditions, however, serious loss may occur in shipments before the peppers can be marketed.

Refrigeration below 40°F. will retard the development of the decay but will not completely check it. The development of field or packing–house treatments together with careful grading out of all spotted fruits at loading time appears to be the best method of control.

Cladosporium herbarum, formerly determined as a strain of *C. fulvum* Cke., has previously been associated with a decay of tomatoes in the United States and in Italy and Norway. Apparently, occurrence on peppers is reported only in this country.

First Record of An Olive Insect

Lepidosaphes destefanii Leonardi, a scale insect, was collected on olive near Cloverdale, Sonoma County, California in April 1952. This is the first record of the occurrence of this insect in the United States. It has been reported to occur on an oleaceous plant, *Phyllyrea media*, in Italy (Sicily) and Greece. Preliminary survey outside of the known infested area in Sonoma County and in other California localities has, so far, failed to indicate other infestations.

Alfalfa Weevil Spreads Eastward

The alfalfa weevil, *Hypera postica* (Gyll.), an accidentally introduced Mediterranean insect first observed in the State of Utah in 1904, was found in the State of Maryland in April 1952. This was the first record of the occurrence of this insect east of the State of Nebraska. Later in the year, this insect was also found in the States of Delaware, New Jersey, Pennsylvania, and Virginia.

Cotton Insects

The first cotton leafworm, *Alabama argillacea* (Hbn.), of the 1952 season was observed on cotton near Bayview, Cameron County, Texas on 3 June. With one exception, 11 May 1950, this was the earliest date that the leafworm had been found in Texas in eight years. The latest date on record for annual first recovery is 18 July 1949. This is a migratory insect not known to overwinter in the United States.

The pink bollworm, *Pectinophora gossypiella* (Saund.), caused commercial damage to cotton in certain portions of the southern part of Texas in 1952. Surveys now under way have resulted in discovery that this insect has spread into additional areas in Texas and Louisiana. State and Federal quarantines are being continued in force to assist in the prevention of further spread of this serious cotton pest.

Outbreaks of Spruce Beetle

A windstorm which swept across the timber belts of northwestern Washington, northern Idaho, and western Montana on 27 November 1949 resulted in the uprooting of many spruce trees. Those trees in the meantime have served as a nucleus for the building up of a population of the Engelmann spruce beetle, *Dendroctonus engelmanni* Hopk., which became unusually heavy in 1952 in these areas.

Wheat Rusts in Spain in 1952

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As a result of its topographical complexity, the climate of Spain not only varies greatly but may be even completely contrary from one region to another. Such differences also exist within a region where the extremely varied weather is determined by local geographical factors.

For this reason, any attempt to summarize or to generalize about ecological conditions in Spain must take into account innumerable exceptions. In general, however, the amount of rainfall in the spring is a decisive factor in cereal production, not only because of its effect on plant growth, but also through its influence on the development of rust epidemics.

Factors Affecting Rust Development

In average years, climatic conditions are unfavorable for the development of rust epidemics over most of the wheat–growing regions, as moisture is insufficient and rain comes late. Consequently, the first foci of infection usually appear when wheat plants have already passed their most susceptible stage. In such years, rusts can develop only where local conditions are propitious, as in the hollows of valleys and along river banks where there are frequent fogs and dews. Although a localised outbreak may cause loss up to 40 percent in yield, such losses are almost negligible compared with the total production of the wheat–growing regions.

More general outbreaks occur normally along the fringe of land parallel to the coast, especially from Huelva to the Ebro river mouth. Although there is very little rain in some parts of this fringe (e. g., in Alméria), the prevailing high atmospheric humidity promotes the formation of heavy dews. Moreover, in this strip of land along the Mediterranean coast, *Puccinia graminis* Pers. overwinters perfectly in the uredial stage. The writer has studied wheat plants severely infected with uredinia of this rust, which were collected in the months of December and January, for example, in Castellón.

Rusts are frequently destructive also in some districts at higher altitudes in the interior of the country, especially in the province of Cuenca, where *Berberis* bushes abound.

In brief, although localized losses of wheat due to rust infection may amount to as much as 40 per cent of the yield in normal years on the coast and in some parts of the interior, where cereal production is of little importance, the nation's total wheat production only suffers an average loss of from 5 to 10 percent.

In exceptional years, however, when rainy spring weather and temperatures favorable for rust development prevail, rust epidemics usually spread with varying intensity over the whole country.

Epidemics in 1952

In 1952, and particularly in 1951, rust epidemics in Spain were more severe than usual. The difference between these two years in rust intensity was especially obvious in the southern half of the country, where in 1952, with the exception of certain regions in Cadiz, Murcia, and particularly the province of Cuenca, rusts were prevalent but not severe.

In the last half of June 1952, stormy weather with heavy rainfall prevailed in almost the entire peninsula, followed by a rapid increase in temperature. These conditions provided a favorable environment for the epidemic of *P. graminis* which spread spectacularly and with increasing severity until the end of the month over most of the important wheat–growing regions.

These included the province of Cuenca, certain areas in the north and center of the country and, in particular, much of the provinces of Leon and Castilla (Cuenca del Duero). At that moment the wheat in those areas was precisely at the most susceptible stage of development and the average losses were estimated to be nearly 20 percent, severe sporadic attacks, of course, causing far more damage. In southern Spain, however, the wheat was less affected by the epidemic, as it was then already mature or being harvested.

Among the three rust species attacking wheat, stem rust, *P. graminis*, was the most pernicious, being responsible for great reduction both in yield and in weight per unit volume in 1952. Significant losses were also caused by yellow rust, *Puccinia glumarum* (Schum.) Eriks. et Henn., which was favored by warm weather early in the spring. Outbreaks of leaf rust, *Puccinia rubigo–vera tritici* (Eriks.) Carleton, were also found in nearly every wheat–growing region, but were of only minor importance.

Physiologic Races

Among the physiologic races of *P. graminis tritici* Eriks. et Henn. identified from collections of rusted wheat in 1952, the most prevalent were races 17, 21, 14, 24, and 133, which together comprised over 80 percent of the total of collections. Similar results were obtained in previous years, the only difference being that, in 1951, race 21 appeared more frequently than race 17, and in previous years race 14 was predominant.

The most prevalent physiologic races of *P. rubigovera tritici* found in 1952, as in 1951, were races 14, 26, 4, and 84. Among other collections, several were believed to be previously unrecorded races, which are now under study.

Outbreaks and New Records

Israel

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DURING the period from July to September 1952, the losses caused by plant diseases and insect pests in Israel were in general on a low level. Although there was a shortage in the supply of fungicides and pesticides, timely application of standard control measures succeeded in preventing any serious outbreaks. The abnormal weather in September, prevailing high day temperature, high humidity and relatively small amount of dew, however, increased the incidence of diseases, especially in vegetable crops.

Fruit Crops

Mediterranean fruit fly. Fruits liable to attack by the Mediterranean fruit fly, *Ceratitis capitata* (Wied.), are available in Israel throughout the year. Its development is favoured mainly by warm weather with high humidity. In September 1952 there was an increase in the fly population, and early varieties of citrus fruits are likely to be infested. Damage to deciduous fruits during the last summer was on the average slightly lower than in normal years, but tropical fruits such as guava, persimmon and avocado were heavily attacked by the fly in August and September.

Lygaeid bug. Larvae of the lygaeid bug (*Metopoplax origanii* Kol. var. *fascinervis* Stoel.) caused localized but severe damage in the north, killing many young trees of olive, citrus and pomegranate.

Pests of citrus. The citrus black scale, *Chrysomphalus aonium* (L.), is now widespread in the citrus belt but infestation in 1952 was rather light in comparison with previous years. Spraying with mineral oils is a standard control practice, widely adopted in the infested groves.

Citrus rust mite, *Phyllocoptruta oleivora* (Ashmead), was more prevalent in 1952, the infestation area being more widespread than in previous years.

Cottony-cushion scale, *Icerya purchasi* Mask.) occurred during the season only in small scattered outbreaks and were controlled by its natural enemy, the Australian lady beetle (*Novius cardinalis* Muls.). The lady beetle was introduced into Israel in 1912 and is now established nearly everywhere cottony-cushion scale occurs.

Stem borer, (*Apate monachus* Fabr.) a polyphagous insect, caused considerable damage to citrus as well as to deciduous fruit trees. Neglected citrus groves served as the foci of infestation for many insects attacking citrus, including this borer.

Pest and diseases of deciduous fruits. Infestation of apples and plums by red mite (*Epitetranychus althaeae* van Hanst.) was controlled by its natural enemy, *Scymnus punctillum* Weise, in northern Israel; while in the southern part of the country it caused some slight damage.

The infestation of the codling moth, *Carpocapsa pomonella* (L.), was generally slight. In some deciduous orchards, however, over 50 percent of fruits were infested in spite of treatments, especially where old trees were retained.

Some varieties of apples, especially in orchards with overhead irrigation, were heavily infested by *Gloeosporium* sp. causing fruit spot. Root rot, caused by *Sclerotium rolfsii* Sacc., was also prevalent in some localities.

Stone fruit trees, except those treated with sulphur or Dithane, suffered from early fall of leaves as a result of the infection of the rust, *Puccinia pruni-spinosae* Pers.

Pests and diseases of grape vine. Grape vine is a preferred host of citrus mealy bug, *Pseudococcus citri* (Risso), but its incidence in vineyards this year was low, on account of the prevalence of natural enemies such as

Sympherobius sanctus Tjed., lady beetles, and other predacious and parasitic species.

Slight damage was caused by grape berry moth (*Polychrosis botrana* Schiff.), in vineyards where treatments were not practised or not properly applied. During the past three years, field trials have been carried out to determine the possibility of prolonging the harvesting period of grapes through the control of the berry moth and mealy bug, and to increase the contents of sugar and aroma required for wine manufacturing without raising the toxic residue. An application of sodium fluoaluminate (Kryocide) followed by two dustings of DDT proved to be effective in controlling the pests and to increase the sugar content of the grapes from 18 to 24 per cent.

Downy mildew, caused by *Plasmopara viticola* (Berk. et Curt.) Berl. et de Toni, was widespread and caused considerable damage in the coastal area.

Vegetables and Field Crops

Cotton worm. *Prodenia litura* Fabr. is a polyphagous species, attacking a number of fruit trees, legumes, vegetables, beets and ornamental plants in Israel. During the season referred to here, it was particularly destructive on vegetables, groundnuts, certain field crops and nursery trees. Poison bait, the standard material for its control, could not be used due to shortage of bran. Trials with Dieldrin sprays and dusts gave satisfactory control.

Pests and diseases of tomatoes. Tomato fruits were heavily damaged by fruitworms (*Chloridea* spp.), in some localities as much as 50 per cent of the fruits being affected. Preventive treatment with DDT was rather successful.

Diseases affecting tomatoes were numerous and prevalent. Severe damage was caused by *Alternaria* sp. in the coastal plain, and by *Pythium* sp. in the Beisan valley. Leaf mold (*Cladosporium fulvum* Cke.) was destructive in the south. Stem and root rot, caused by *Sclerotium rolfsii*, appeared towards the end of September.

Mildews of cucurbits. Cucumber and melons were infected early by powdery mildew (*Oidium* sp.) and downy mildew (*Pseudoperonospora cubensis* (Berk. et Curt.) Rostov.), both of which decreased later in the season. Plants with overhead irrigation suffered more heavily from these diseases.

Downy mildew of crucifers. Cabbages and cauliflowers in seedbed were damaged, and in some cases killed, by downy mildew, *Peronospora parasitica* (Pers.) Fr. Application of copper fungicides at low concentrations gave good control.

Powdery mildew of tobacco. Widespread infection of powdery mildew, *Erysiphe cichoracearum* DC., was found in tobacco fields, causing serious damage. In some fields, as much as 20 per cent of the leaves were affected.

Netherlands New Guinea

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Giant Snail in Manokwari

The giant snail, *Achatina fulica* (Bowdich), is still limited to the residential areas of Manokwari. Its population usually increases significantly after a wet period, whereas drought retards its activities. It is believed that this snail is unable to cross the patches of jungle isolating the small farms from the town and from each other. This assumption is supported by the fact that a concentration of empty shells was often found in the outer regions of the forest surrounding the town. In a few cases naked snails, probably parasitic, were observed on the shells of the giant snail. Experiments will be made to ascertain the carnivorous habits of the naked snail.

European Corn Borer

During September and October 1952, small populations of the European corn borer, *Pyrausta nubilalis* (Hub.), were observed on maize in the districts of Hollandia and Manokwari and in the Island of Japen, and also on sorghum in the Ransiki plain 80 km. south of Manokwari, causing scarcely any harm.

Rats Damaging Groundnut

The groundnut harvest was destroyed by rats (*Rattus rattus* L.) in Sansapor, in North Vogelkop. The use of poisons, such as phosphoric and arsenic derivates, is ineffective for the control of rats which very often do not touch the bait at all. The New Guinea varieties of rats appear to have a very good sense of smell.

Uganda

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Outbreaks of New Diseases

Banana wilt. *Fusarium oxysporum* var. *cubense* (E. F. Sm.) Wollenw. in bananas was positively determined by R. M. Nattrass from material collected by D. L. Downie on 13 May 1952 in Ankole district, lat. 0.225 S., long. 30.27 E. This disease has now been determined from four localities extending from lat. 0.41 S., long. 30.10 E. to lat. 0.08 S., long. 30.35 E., at 5,500 ft. above mean sea level.

Maize rust. *Puccinia polysora* Underw. was positively determined by R. M. Nattrass from material collected by H. H. Storey on 18 August 1952 in Mengo district, lat. 0.25 N., long. 32.32 E., at 3,900 ft. above mean sea level. This disease has now been determined from numerous widely scattered localities, and is presumed universal for all practical purposes.

The above information was sent to me from Uganda by the Senior Research Officer, Department of Agriculture.

PLANT QUARANTINE ANNOUNCEMENTS

French Morocco

Vizierial Decree of 13 October 1952, published in the Bulletin Officiel No. 2088, 31 October of the same year, prohibits the importation into and transit through the French zone of the Sherifien Empire (Morocco) of the cotton plants and parts thereof (*Gossypium* spp.), on account of the following diseases: Fusarium wilt (*Fusarium vasinfectum* Atk.), angular leaf spot (*Phytomonas malvacearum* (Sm.) Bergey), and leaf-curl virus. The importation of the following materials, however, is exempt from the prohibition:

(*a*) ginned fibres;
(*b*) cotton seeds for oil extraction;
(*c*) samples of seeds of limited quantities, subject to the decision of the Director of Agriculture and Forestry, who will determine, in each case, the conditions for the introduction and multiplication.

Norway

Royal Resolution of 14 March 1952 contains regulations concerning the imports of potatoes. A license must be obtained from the Department of Agriculture for each consignment of potatoes to be imported into Norway.

Potatoes for consumption are allowed entry only if they are shipped directly from the country of origin where the Colorado beetle (*Leptinotarsa decemlineata*) is not known to exist and are accompanied by an official certificate establishing the following facts:

(*a*) freedom from the Colorado beetle in the exporting country;
(*b*) freedom from wart disease (*Synchytrium endobioticum*) and potato root nematode (*Heterodera rostochiensis*) in the producing district;
(*c*) freedom from Colorado beetle, wart disease and potato moth (*Phthorimaea operculella*) in the consignment after thorough examination;
(*d*) Package in sealed new sacks or boxes.

Seed potatoes are allowed entry only under special provisions, including the growing of the potatoes under quarantine.

United States of America

An amendment to Chapter III, Title 7 of the Code of Federal Regulations, published in the Federal Register, Vol. 17, No. 207, 22 October 1952, prohibits the entry of all living stages, including eggs, of all species of terrestrial or freshwater forms of the phylum Mollusca from any foreign country or Guam into the whole territory of the United States (excluding Guam), unless under permit and in compliance with prescribed safeguards.

Except for scientific purposes, permits will not be issued for the entry of the giant African snail (*Achatina fulica*) or any other species of *Achatina; Theba pisana;* any species of slug; or any other species of mollusks similar to the giant African snail in its destructiveness to plant life.

Any carrier or other regulated article found upon examination to be infested with any mollusk prohibited shall be promptly removed from the United States or treated in a prescribed manner.

NEWS AND NOTES

FAO Advisory Committee on Locust

The second meeting of the FAO Technical Advisory Committee on Desert Locust Control, held 3–6 November 1952 at FAO Headquarters in Rome, was attended by representatives from Egypt, France, India, Pakistan, U.S.A. and U.K.

The Committee reviewed steps taken by FAO to coordinate international action against the Desert Locust and to establish reserves of vehicles and other anti-locust equipment. In view of the considerable benefits that had already resulted, the Committee discussed further steps that FAO might take to meet the increasing danger.

The Desert Locust Plague

In future issues of the Bulletin it is proposed to list those countries currently attacked by the Desert Locust. The present plague is believed to have developed in interior Arabia about Octo-

ber 1948. The plague expanded so that by the end of 1951 over twenty territories from India to Morocco were attacked. Since then the plague has fluctuated in extent and intensity. The following countries were known to be affected during July to October 1952:

July	India, Pakistan, Iran, Iraq, Syria, Oman, Saudi Arabia, Eastern Aden Protectorate, Western Aden Protectorate, Yemen, British Somaliland, Somalia, Ethiopia, Eritrea, Sudan.
August	India, Pakistan, Yemen, Western Aden Protectorate, British Somaliland, Ethiopia, Eritrea, Sudan.
September	India, Pakistan, Yemen, British Somaliland, Somalia, Ethiopia.
October	India, Pakistan, Iran, Oman, Saudi Arabia, Eastern Aden Protectorate, Western Aden Protectorate, Yemen, British Somaliland, Somalia, Ethiopia, Eritrea, Sudan.

Information for November is not complete, but it is known that the plague has extended to Kuwait and Kenya.

The above information is largely based on the Monthly Situation Summaries issued by the Anti-Locust Research Centre, London, to which due acknowledgement is made.

San José Scale non-Existent in the Netherlands.

With reference to the article, "San José scale in Western Europe in 1951," published in Vol. 1, No. 1, of this Bulletin, the European Plant Protection Organisation requested the publication of the following statement by C.J. Briejer, Director of the Netherlands Plant Protection Service:

"San José scale in the Netherlands was only found on material imported from another country. It never settled in our nurseries or on other trees and shrubs cultivated or wild in the Netherlands. The small amount of imported material already planted was traced and destroyed. Thus, I can state that to the best of my knowledge, the San José scale does not occur in the Netherlands."

Roma – Tipografia del Senato del dott. Giovanni Bardi

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